



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

July 27, 2006

Joshua A. Creem
General Counsel
Corillian Corporation
3400 NW John Olsen Place
Hillsboro, OR 97124

RE: July 26, 2006 letter from ERM; June 27, 2006 Meeting; and April 2006 Quality Assurance Project Plan.
Former CEE Associates/InteliData Facility, 80 Pickett District Rd., New Milford, CT, CTD044121697

Dear Mr. Creem:

Thank you for the letter dated July 26, 2006 from ERM which responded to issues raised in the draft letter I sent you via e-mail dated May 2, 2006 (attached). Our June 27 meeting with the Connecticut Department of Environmental Protection (DEP); ERM; LeBoeuf, Lamb, Greene & MacRae LLP; Corleto & Associates, P.C.; and Edelman Leather to discuss these issues was very helpful. The purpose of this letter is to summarize the agreements we reached during the June 27 meeting regarding the proposals made in the July 26 letter. In addition, this letter provides EPA's comments on InteliData's April 2006 Quality Assurance Project Plan, received by EPA on May 12. This letter does not address the September 30, 2005 Notice of Violation issued by DEP, which was also discussed during our June 27 meeting.

I. July 26, 2006 Letter and June 27, 2006 Meeting

1. Site Walk: During the site walk at the outset of the June 27 meeting, it was noted that monitoring well ERM-10 is not located correctly on the site figures. Future site figures should present the correct location for ERM-10. In addition, InteliData should review the site figures to be sure that all other wells are correctly located and that any conclusions related to groundwater flow or contaminant distribution for the true well locations are accurately documented.

2. General Comment 2 from July 26 Letter: The July 26 letter indicates that InteliData will coordinate with Neeltran to get access to the Neeltran property. InteliData's first objective will be to get access to allow them to conduct surface geophysical activities to try and locate MW-17. If MW-17 cannot be found, the letter indicates that ERM will coordinate with Neeltran to get access to allow them to install up to 6 groundwater profile borings on the Neeltran property. InteliData's objective will be to identify the mid-point of the overburden plume. During the June 27 meeting, EPA requested that InteliData use one or more of the 6 overburden profile locations

to collect additional data on the overburden plume in the southeast portion of the IntelliData facility. EPA specified that groundwater in the area east of MW-2 should be characterized. IntelliData indicated that they could install groundwater profile borings on the IntelliData property near the road and south of their driveway. IntelliData will install at least one groundwater profiling location in this southeast area of the site regardless of whether MW-17 is found. IntelliData agreed at the meeting that if these results show that the groundwater plume is different than they expected and/or if it appears that the concentrations of VOCs in the overburden groundwater suggest any vapor intrusion concerns for the residence across the street, the focus of their investigation will be to characterize the extent of the plume in this area.

3. General Comment 3 from July 26 Letter: EPA agrees with the approach for investigating groundwater contamination in bedrock, as set out in General Comment 3. Based on our discussion at the meeting, EPA understands that if the investigation results suggest that contaminants previously detected in bedrock wells at the site are not in competent bedrock, IntelliData will propose additional steps to characterize the extent of contamination in the weathered bedrock.

4. General Comment 4 from July 26 Letter: As we discussed during our meeting with you on June 27, project action limits for 1,4-Dioxane, for purposes of evaluating project quantitation limits, may be calculated using the procedures set out in the Connecticut Remediation Standard Regulations for calculating alternative Surface Water Protection Criteria and Volatilization Criteria for Groundwater. In the absence of appropriate inputs for these equations, the default GA Groundwater Protection Criterion of 20 ug/L may be used, as proposed in General Comment 4. The use of these criteria as project action limits for 1, 4-Dioxane is acceptable since IntelliData has confirmed that groundwater downgradient of the facility is not being used as drinking water.

5. Specific Comment 19 from July 26 Letter: This comment addresses the requirement, included in the September 20, 2004 Current Human Exposures Under Control Environmental Indicator Determination for IntelliData, that IntelliData provide written notice to the current owner of the 80 Pickett District Road facility that VOCs from subsurface contamination may be entering indoor air in the facility building and that IntelliData provide a copy of that written notice to EPA. IntelliData's July 26 letter notes that "the SVE system is currently active at the Site. This system has set up a significant negative pressure beneath the floor slab, and this precludes the entry of vapors from beneath the slab into the building. If necessary, ERM could modify the existing notification to the building owners to state that, should the SVE system be incapacitated, VOCs vapors could enter the structure." During our June 27 meeting, EPA agreed that this language is acceptable. Please incorporate the proposed language into a written notice and provide it to current facility owner, with a copy to EPA, within 60 days of the date of this letter.

As we discussed at the meeting, EPA is requesting that RCRA Corrective Action facilities prepare contingency plans for remediation systems that could be shut down due to the interruptions of power supply or absence of personnel that could result during an outbreak of avian flu. Please prepare such a contingency plan for the SVE system and provide a copy to EPA within 60 days of the date of this letter.

6. **Schedule:** As we discussed at the June 27 meeting, EPA requests a comprehensive, long-term schedule for RCRA Corrective Action activities at the former IntelliData facility. The schedule should include target dates for Corrective Action milestones, including achieving Migration of Contaminated Groundwater Under Control, making a site-wide remedy decision, and achieving completion of Corrective Action. In addition, the schedule should include projected dates for the tasks (including planning and reporting) necessary to achieve each of these milestones (e.g., steps necessary to characterize the nature and extent of the groundwater plume and assess its stability, steps necessary to close out AOCs, and planned AS/SVE activities and monitoring). It is understood that the schedule for some of the proposed work depends on events that are outside of IntelliData's control, such as receipt of access permission from Neeltran. In this case the schedule could be specified in terms of the time-frame, following receipt of access permission, during which field work on the Neeltran property is expected to occur, for example. The schedule will likely shift over time, depending on the findings of the investigation, etc. Therefore, it may make sense for the schedule to be presented in a table, spreadsheet, or other format that is easy to modify.

During our June 27 meeting, ERM committed to submitting a revised, comprehensive RCRA Corrective Action schedule to EPA within the next few weeks. Please provide this schedule within 60 days of the date of this letter. In addition, please revise and resubmit the schedule as necessary – annually at a minimum (e.g., with IntelliData's annual Remediation Report).

II. April 2006 Quality Assurance Project Plan

General Comments

1. Please revise the QAPP to include the analysis of groundwater samples for 1,4-Dioxane.
2. The QAPP indicates that groundwater samples will be analyzed for barium, total chromium, lead, copper, and zinc. Please provide justification, based on historical information on facility processes and previous waste, soil, and groundwater data, for ruling out analyses of other metals.
3. Soil sampling for copper, nickel, and zinc at AOCs 2 and 3 was recommended in the June 2002 Summary Report and Phase III Work Plan. EPA does not have further information as to whether this task was ever performed. If this sampling is yet to be performed, please revise the QAPP to include this work.

Specific Comments

4. Page 2-2, Section 2.1 Operation and Maintenance of Soil Vapor Extraction/Air Sparge System

The last paragraph states "the ground water samples will be analyzed for CVOC only". According to Section 4.4 Analytical Methods the ground water is to be analyzed by

Method 8260B for VOCs. Please report the complete Method 8260B VOC parameter list or explain why the Method 8260B VOC parameter list is not being reported.

5. Page 2-3, Section 2.1 Operation and Maintenance of Soil Vapor Extraction/Air Sparge System

The third bullet states “to maintain an SVE / AS effluent which does not exceed the maximum allowable stack concentration (MASC) established in section 22a-174-29 of the Regulations of Connecticut State Agencies (RCSA)”. Please specify whether the regulations require that the SVE /AS effluent sample be collected using a specific sampling procedure.

6. Page 2-5, Section 2.3 Post-Remedial/Compliance Vapor Monitoring

This Section states “each soil vapor sample will be analyzed for CVOCs via EPA Method TO-14A”. Please report the complete Method TO-14A VOC parameter list or explain why the Method TO-14A VOC parameter list is not being reported.

7. Page 4-2, Section 4.2.1 O&M of Soil Vapor Extraction/Air Sparge System

This Section references Figure 12 and 13 in the Process & Instrument Drawing in Appendix A. These drawings do not appear to have been included in Appendix A. If these drawing include the sampling locations, then these figures should be included in the QAPP. If the figures do not include the sampling locations, then please add a drawing to the QAPP showing the sampling locations.

8. Page 4-5, Section 4.2.2 Post-Remedial/Compliance Ground Water Monitoring

The first paragraph of Section 4.2.2 indicates that low flow sampling is to be used to purge the monitoring wells listed in that Section. The list of wells identified in Section 4.2.2 includes seven wells that are not included in Table 6, Sampling Matrix and Analytical Sampling Methods/SOPs. Please revise Section 4.2.2 or Table 6 to address this apparent discrepancy.

In addition, the CT DEP Draft low flow sampling guidance that is cited, which is similar to the EPA Region 1 guidance, indicates that “Typically, screen lengths are limited to 10 feet and the pump intake is located at the midpoint of the saturated screen length. The location of the pump intake should be adjusted if strata of higher permeability or areas of higher concentrations of pollutants can be identified. When possible, pump intakes should be located at least 2 feet above the bottom of the well in order to minimize the possibility of mobilizing sediment from the bottom of the well.” The general language provided in the “Sample Depth (feet)” column in Table 6 does not appear to adequately identify the interval within each monitoring well that will be sampled. Please explain how the sample intervals will be identified within each monitoring well, especially the wells that do not have a 10 foot well-screen.

The third full paragraph in Section 4.2.2 mentions using peristaltic pumps for water depths less than 28 feet and “submersible or bladder” pumps for depths greater than 28 feet. Please revise the QAPP to provide additional information on the types of pumps that have been historically used to collect samples at the site (i.e., if determined by depth,

if applicable) and provide a discussion regarding whether the pump types that have been historically used are a determining factor for the pump types selected for future sampling. The U.S. EPA generally does not recommend using peristaltic pumps because they can cause sample mixing and oxidation resulting in degassing and a loss of volatiles. In addition, the type of submersible pump, if not bladder, should also be identified.

9. Page 4-12, Section 4.7 Instrument/Equipment Calibration and Frequency

Please change the following sentence "field equipment will be calibrated at a minimum frequency of once per day, prior to the start of the field operations" to "field equipment will be calibrated at a minimum frequency of once per day (prior to the start of the field operations) and a post calibration check will be performed to determine if the equipment remained in calibration throughout the day".


Since the calibration procedures vary between manufacturers, please use the USEPA Region 1 Draft *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction potential [ORP], and turbidity)*, June 3, 1998 (enclosed), for calibrating these instruments/equipment for consistency.

10. Table 8: Project Action Limits

The QAPP indicates that groundwater samples from specified wells will be analyzed for total PCBs. However, total PCBs do not appear to have been included in Table 8. Please revise Table 8 to include PCBs.

Please provide the information requested in section I of this letter, items 5 and 6, within 60 days of the date of this letter. In addition, please provide the modifications to the QAPP, requested in section II of this letter, within 90 days of the date of this letter. Please feel free to contact me at 617/918-1363 if you have any questions on this letter.

Sincerely,


Stephanie Carr
RCRA Facility Manager

Enclosures

cc: R. Drake, ERM
K. King, ERM
T. Quillen, Tech Law
G. Shteynberg, CT DEP

SOP #:
Region 1 Calibration of
Field Instruments
Revision Number: DRAFT
Date: June 3, 1998
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U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 1

DRAFT CALIBRATION OF FIELD INSTRUMENTS
(temperature, pH, dissolved oxygen, conductivity/specific conductance,
oxidation/reduction potential [ORP], and turbidity)

I. SCOPE & APPLICATION

The purpose of this standard operating procedure (SOP) is to provide a framework for calibrating field instruments used to measure water quality parameters for ground water and surface water. Water quality parameters include temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction potential [ORP], and turbidity. This SOP supplements, but does not replace, EPA analytical methods listed in 40 CFR 136 and 40 CFR 141 for temperature, dissolved oxygen, conductivity/specific conductance, pH and turbidity.

This SOP is written for instruments that utilize multiple probes (temperature, pH, dissolved oxygen, conductivity/specific conductance, and/or oxidation/reduction potential [ORP]) and the probe readings for pH, dissolved oxygen, and specific conductance are automatically corrected for temperature. Communications to the instrument (programming and displaying the measurement values) are performed using a display/logger or a computer. Information sent to the instrument is entered through the keypad on the display/logger or computer. It is desirable that the display/logger or computer have data storage capabilities. If the instrument does not have a keypad, follow the manufacturer's instructions for entering information into the instrument.

For ground water monitoring, the instrument must be equipped with a flow-through-cell, and the display/logger or computer display screen needs to be large enough to simultaneously contain the readouts of each probe in the instrument. Turbidity is measured using a separate instrument because turbidity cannot be measured in a flow-through-cell. This procedure is applicable for use with the EPA Region 1 Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells.

II. GENERAL

All monitoring instruments must be calibrated before they are used to measure environmental samples. Part of the calibration is performed prior to the field event. For instrument probes that rely on the temperature sensor (pH, dissolved oxygen, conductivity/specific conductance, and

oxidation/reduction potential [ORP]), each temperature sensor needs to be checked for accuracy against a thermometer that is traceable to the National Institute of Standards and Technology (NIST) . Before any instrument is calibrated or used to perform environmental measurements, the instrument must stabilize (warm-up) according to manufacturer's instructions.

Most instruments will require at least two standards to bracket the expected measurement range, that is, one standard less than the expected value and one higher. Calibration must be performed at the beginning of each sampling day prior to sample collection. To determine if the instruments have remained in calibration during transport to each sampling location, use one of the previously used standards as a check standard at the sampling site. If the check measurement does not agree with the initial calibration or to within the specifications of the instrument, then the instrument must be re-calibrated. When an environmental sample measurement falls outside the calibration range, the instrument must be re-calibrated to bracket the new range before continuing measurements.

This SOP requires that the manufacturer's instruction manual (including the instrument specifications) accompany the instrument into the field.

III. CALIBRATION PROCEDURES

Prior to calibration, all instrument probes must be cleaned according to the manufacturer's instructions. Failure to perform this step (proper maintenance) can lead to erratic measurements.

Program the multi-probe instrument so that the following parameters to be measured will be displayed: temperature, pH, percent dissolved oxygen, mg/l dissolved oxygen, conductivity, specific conductance, and ORP.

The volume of the calibration solutions must be sufficient to cover both the probe and temperature sensor (see manufacturer's instructions for additional information).

While calibrating or measuring, make sure there are no air bubbles lodged between the probe and the probe guard.

TEMPERATURE

Most instrument manuals state there is no calibration of the temperature sensor, but the temperature sensor must be checked to determine its accuracy. This accuracy check is performed

at least once per year and the accuracy check date/information is kept with the instrument. If the accuracy check date/information is not included with the instrument or the last check was over a year, the temperature sensor accuracy needs to be checked at the beginning of the sampling event. If the instrument contains multiple temperature sensors, each sensor must be checked.

Verification Procedure

1. Allow a container filled with water to come to room temperature.
2. Place a thermometer that is traceable to the National Institute of Standards and Technology (NIST), and the instrument's temperature sensor into the water and wait for both temperature readings to stabilize.
3. Compare the two measurements. The instrument's temperature sensor must agree with the reference thermometer measurement within the accuracy of the sensor (usually $\pm 0.15^{\circ}\text{C}$). If the measurements do not agree, the instrument may not be working properly and the manufacturer needs to be consulted.

pH (electrometric)

The pH of a sample is determined electrometrically using a glass electrode.

Choose the appropriate buffered standards that will bracket the expected values at the sampling locations. For ground water, the pH will usually be close to seven. Three standards are needed for the calibration: one close to seven, one at least two pH units below seven and the other at least two pH units above seven. For those instruments that will not accept three standards, the instrument will need to be re-calibrated if the water sample's pH is outside the initial calibration range described by the two standards.

Calibration Procedure

1. Allow the buffered standards to equilibrate to the ambient temperature.
2. Fill calibration containers with the buffered standards so each standard will cover the pH probe and temperature sensor.

3. Remove probe from its storage container, rinse with distilled water, blot dry with soft tissue.
4. Select monitoring/run mode. Immerse probe into the initial standard (e.g., pH 7).
5. Stir the standard until the readings stabilize. If the reading does not change within 30 seconds, select calibration mode and then select "pH". Enter the buffered standard value into instrument. Select monitoring/run mode. The readings should remain within manufacturer's specifications; if they change, re-calibrate. If readings continue to change after re-calibration, consult manufacturer.
6. Remove probe from the initial standard, rinse with distilled water, and blot dry.
7. Immerse probe into the second standard (e.g., pH 4). Repeat step 5.
8. Remove probe from the second standard, rinse with distilled water, and blot dry. If instrument only accepts two standards, the calibration is complete. Go to step 11. Otherwise continue.
9. Immerse probe in third buffered standard (e.g., pH 9) and repeat step 5.
10. Remove probe from the third standard, rinse with distilled water, and blot dry.
11. Select monitoring/run mode, if not already selected. To ensure that the initial calibration standard (e.g., pH 7) has not changed, immerse the probe into the initial standard. Wait for the readings to stabilize. The reading should read the initial standard value within the manufacturer's specifications. If not, re-calibrate the instrument. If re-calibration does not help, the calibration range may be too great. Reduce calibration range by using standards that are closer together.
12. The calibration is complete. Place pH probe in its storage container.

DISSOLVED OXYGEN

Dissolved oxygen (DO) content in water is measured using a membrane electrode. The DO probe's membrane and electrolyte solution should be replaced prior to the sampling period. Failure to perform this step may lead to erratic measurements.

Calibration Procedure

1. Gently dry the temperature sensor according to manufacturer's instructions.
2. Place a wet sponge or a wet paper towel on the bottom of the DO calibration container.
3. Place the DO probe into the container without the probe coming in contact with the wet sponge or paper towel. The probe must fit tightly into the container to prevent the escape of moisture evaporating from the sponge or towel.
4. Allow the confined air to become saturated with water vapor (saturation occurs in approximately 10 to 15 minutes). During this time, turn-on the instrument to allow the DO probe to warm-up. Select monitoring/run mode. Check temperature readings. Readings must stabilize before continuing to the next step.
5. Select calibration mode; then select "DO %".
6. Enter the local barometric pressure (usually in mm of mercury) for the sampling location into the instrument. This measurement must be determined from an on-site barometer. Do not use barometric pressure obtained from the local weather services unless the pressure is corrected for the elevation of the sampling location. [Note: inches of mercury times 25.4 mm/inch equals mm of mercury or consult Oxygen Solubility at Indicated Pressure chart attached to the SOP for conversion at selected pressures].
7. The instrument should indicate that the calibration is in progress. The instrument will take approximately one minute to calibrate. After calibration, the instrument should display percent saturated DO.
8. Select monitoring/run mode. Compare the DO mg/l reading to the Oxygen Solubility at Indicated Pressure chart attached to the SOP. The numbers should agree. If they do not agree to the accuracy of the instrument (usually ± 0.2 mg/L), repeat calibration. If this does not work, change the membrane and electrolyte solution.
9. Remove the probe from the container and place it into a 0.0 mg/L DO standard (see note). The standard must be filled to the top of its container and the DO probe must fit tightly into the standard's container (no head space). Check temperature readings. They must stabilize before continuing.

10. Wait until the "mg/l DO" readings have stabilized. The instrument should read 0.0 mg/L or to the accuracy of the instrument (usually ± 0.2 mg/L). If the instrument cannot reach these values, it will be necessary to clean the probe, and change the membrane and electrolyte solution. If this does not work, prepare a new 0.0 mg/L DO standard. If these measures do not work, contact manufacturer.

Note: To prepare a zero mg/L DO standard follow the procedure stated in Standard Methods (Method 4500-O G). The method basically states to add excess sodium sulfite (until no more dissolves) and a trace amount of cobalt chloride to water. The standard container must be completely filled (no head space). This solution is prepared prior to the sampling event. If some of the solution is lost during instrument calibration, add more water to the container so that the standard is stored with no head space.

SPECIFIC CONDUCTANCE

Conductivity is used to measure the ability of an aqueous solution to carry an electrical current. Specific conductance is the conductivity value corrected to 25°C.

Most instruments are calibrated against a single standard which is near, but below the specific conductance of the environmental samples. A second standard which is above the environmental sample specific conductance is used to check the linearity of the instrument in the range of measurements.

Calibration Procedure

1. Allow the calibration standard to equilibrate to the ambient temperature.
2. Remove probe from its storage container, rinse the probe with a small amount of the conductivity/specific conductance standard (discard the rinsate), and place the probe into the conductivity/specific conductance standard.
3. Select monitoring/run mode. Wait until the probe temperature has stabilized.

4. Look up the conductivity value at this temperature from the conductivity versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. You may need to interpolate the conductivity value between temperatures. Select calibration mode, then conductivity. Enter the temperature corrected conductivity value into the instrument.

5. Select monitoring/run mode. The reading should remain within manufacturer's specifications. If it does not, re-calibrate. If readings continue to change after re-calibration, consult manufacturer.

6. Read the specific conductance on the instrument and compare the value to the specific conductance value on the standard. The instrument value should agree with the standard within the manufacturer's specifications. If not, re-calibrate. If the re-calibration does not correct the problem, the probe may need to be cleaned or serviced by the instrument manufacturer.

7. Remove probe from the standard, rinse the probe with a small amount of the second conductivity/specific conductance standard (discard the rinsate), and place the probe into the second conductivity/specific conductance standard. The second standard will serve to verify the linearity of the instrument. Read the specific conductance value from the instrument and compare the value to the specific conductance on the standard. The two values should agree within the specifications of the instrument. If they do not agree, re-calibrate. If readings do not compare, then the second standard may be outside the linear range of the instrument. Use a standard that is closer, but above the first standard and repeat the verification. If values still do not compare, try cleaning the probe or consult the manufacturer.

8. When monitoring ground water or surface water, use the specific conductance readings.

OXIDATION/REDUCTION POTENTIAL (ORP)

The oxidation/reduction potential is the electrometric difference measured in a solution between an inert indicator electrode and a suitable reference electrode. The electrometric difference is measured in millivolts and is temperature dependent.

Calibration or Verification Procedure

1. Allow the calibration standard (a Zobell solution) to equilibrate to ambient temperature.
2. Remove the probe from its storage container, and place it into the standard.
3. Select monitoring/run mode.
4. While stirring the standard, wait for the probe temperature to stabilize, then read the temperature.
5. Look up the millivolt (mv) value at this temperature from the millivolt versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. You may need to interpolate millivolt value between temperatures. Select "calibration mode", then "ORP". Enter the temperature-corrected ORP value into the instrument.
6. Select monitoring/run mode. The readings should remain unchanged within manufacturer's specifications. If they change, re-calibrate. If readings continue to change after re-calibration, consult manufacturer.
7. If the instrument instruction manual states that the instrument is factory calibrated, then verify the factory calibration against the standard. If they do not agree within the specifications of the instrument, the instrument will need to be re-calibrated by the manufacturer.

TURBIDITY

The turbidity method is based upon a comparison of intensity of light scattered by a sample under defined conditions with the intensity of light scattered by a standard reference suspension. A turbidimeter is a nephelometer with a visible light source for illuminating the sample and one or more photo-electric detectors placed ninety degrees to the path of the light source.

Some instruments will only accept one standard. For these instruments, the standards will serve as check points.

Calibration Procedures

1. Allow the calibration standards to equilibrate at the ambient temperature. The use of commercially available polymer primary standards (AMCO-AEPA-1) is preferred, however, the standards can be prepared using Formazin according to the EPA analytical Method 180.1.
2. If the standard cuvette is not sealed, rinse a cuvette with deionized water. Shake the cuvette to remove as much water as possible. Do not wipe dry the inside of the cuvette because lint from the wipe may remain in the cuvette. Add the standard to the cuvette.
3. Before performing the calibration procedure, make sure the cuvettes are not scratched and the outside surfaces are dry, free from fingerprints and dust. If the cuvette is scratched or dirty, discard or clean the cuvette respectively.
4. Zero the instrument by using either a zero or 0.02 NTU standard. A zero standard (approximately 0 NTU) can be prepared by passing distilled water through a 0.45 micron pore size membrane filter.
5. Using a standard in the range of 5 - 20 NTUs, calibrate according to manufacturer's instructions or verify calibration if instrument will not accept a second standard. If verifying, the instrument should read standard value to within the specifications of the instrument. If the instrument has range of scales, check each range that will be used during the sampling event with a standard that falls within that range.
7. Using a standard between 20 and 100 NTUs, calibrate according to manufacturer's instructions or verify calibration if instrument does not accept a third standard. If verifying, the instrument should read standard value to within the specifications of the instrument. If the instrument has range of scales, check each range that will be used with the proper standard for that scale.

IV. DATA MANAGEMENT AND RECORDS MANAGEMENT

All calibration records must be documented in the project's log book. At a minimum, include the instrument manufacturer, model number, instrument identification number, standards used to calibrate the instruments (including source), calibration date, and the instrument readings.

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References

Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

Turbidity - Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

Oxygen Solubility at Indicated Pressure

Temp. °C	Pressure (Hg)							mm in
	760	755	750	745	740	735	730	
0	29.92	29.72	29.53	29.33	29.13	28.94	28.74	mg/l
1	14.57	14.47	14.38	14.28	14.18	14.09	13.99	
2	14.17	14.08	13.98	13.89	13.79	13.70	13.61	
3	13.79	13.70	13.61	13.52	13.42	13.33	13.24	
4	13.43	13.34	13.25	13.16	13.07	12.98	12.90	
5	13.08	12.99	12.91	12.82	12.73	12.65	12.56	
6	12.74	12.66	12.57	12.49	12.40	12.32	12.23	
7	12.42	12.34	12.26	12.17	12.09	12.01	11.93	
8	12.11	12.03	11.95	11.87	11.79	11.71	11.63	
9	11.81	11.73	11.65	11.57	11.50	11.42	11.34	
10	11.53	11.45	11.38	11.30	11.22	11.15	11.07	
11	11.28	11.19	11.11	11.04	10.96	10.89	10.81	
12	10.99	10.92	10.84	10.77	10.70	10.62	10.55	
13	10.74	10.67	10.60	10.53	10.45	10.38	10.31	
14	10.50	10.43	10.36	10.29	10.22	10.15	10.08	
15	10.27	10.20	10.13	10.06	10.00	9.93	9.86	
16	10.05	9.98	9.92	9.85	9.78	9.71	9.65	
17	9.83	9.76	9.70	9.63	9.57	9.50	9.43	
18	9.63	9.57	9.50	9.44	9.37	9.31	9.24	
19	9.43	9.37	9.30	9.24	9.18	9.11	9.05	
20	9.24	9.18	9.12	9.05	8.99	8.93	8.87	
21	9.06	9.00	8.94	8.88	8.82	8.75	8.69	
22	8.88	8.82	8.76	8.70	8.64	8.58	8.52	
23	8.71	8.65	8.59	8.53	8.47	8.42	8.36	
24	8.55	8.49	8.43	8.38	8.32	8.26	8.20	
25	8.39	8.33	8.28	8.22	8.16	8.11	8.05	
26	8.24	8.18	8.13	8.07	8.02	7.96	7.90	
27	8.09	8.03	7.98	7.92	7.87	7.81	7.76	
28	7.95	7.90	7.84	7.79	7.73	7.68	7.62	
29	7.81	7.76	7.70	7.65	7.60	7.54	7.49	
30	7.68	7.63	7.57	7.52	7.47	7.42	7.36	
31	7.55	7.50	7.45	7.39	7.34	7.29	7.24	
32	7.42	7.37	7.32	7.27	7.22	7.16	7.11	
33	7.30	7.25	7.20	7.15	7.10	7.05	7.00	
34	7.08	7.13	7.08	7.03	6.98	6.93	6.88	
35	7.07	7.02	6.97	6.92	6.87	6.82	6.78	
36	6.95	6.90	6.85	6.80	6.76	6.71	6.66	
37	6.84	6.79	6.76	6.70	6.65	6.60	6.55	
38	6.73	6.68	6.64	6.59	6.54	6.49	6.45	
39	6.63	6.58	6.54	6.49	6.44	6.40	6.35	
40	6.52	6.47	6.43	6.38	6.35	6.29	6.24	
41	6.42	6.37	6.33	6.28	6.24	6.19	6.15	
42	6.32	6.27	6.23	6.18	6.14	6.09	6.05	
43	6.22	6.18	6.13	6.09	6.04	6.00	5.95	
44	6.13	6.09	6.04	6.00	5.95	5.91	5.87	
45	6.03	5.99	5.94	5.90	5.86	5.81	5.77	
46	5.94	5.90	5.85	5.81	5.77	5.72	5.68	

(Continued)

Source: Draft EPA Handbook of Methods for Acid Deposition Studies, Field Operations for Surface Water Chemistry, EPA/600/4-89/020, August 1989.

Oxygen Solubility at Indicated Pressure (continued)

Temp. °C	Pressure (Hg)								mm in
	725	720	715	710	705	700	695	690	
0	28.54	28.35	28.15	27.95	27.76	27.56	27.36	27.17	mg/l
1	13.89	13.80	13.70	13.61	13.51	13.41	13.32	13.22	
2	13.51	13.42	13.33	13.23	13.14	13.04	12.95	12.86	
3	13.15	13.06	12.97	12.88	12.79	12.69	12.60	12.51	
4	12.81	12.72	12.63	12.54	12.45	12.36	12.27	12.18	
5	12.47	12.39	12.30	12.21	12.13	12.04	11.95	11.87	
6	12.15	12.06	11.98	11.89	11.81	11.73	11.64	11.56	
7	11.84	11.73	11.68	11.60	11.51	11.43	11.35	11.27	
8	11.55	11.47	11.39	11.31	11.22	11.14	11.06	10.98	
9	11.26	11.18	11.10	11.02	10.95	10.87	10.79	10.71	
10	10.99	10.92	10.84	10.76	10.69	10.61	10.53	10.46	
11	10.74	10.66	10.59	10.51	10.44	10.36	10.29	10.21	
12	10.48	10.40	10.33	10.28	10.18	10.11	10.04	9.96	
13	10.24	10.17	10.10	10.02	9.95	9.88	9.81	9.74	
14	10.01	9.94	9.87	9.80	9.73	9.66	9.59	9.52	
15	9.79	9.72	9.65	9.68	9.51	9.45	9.38	9.31	
16	9.58	9.51	9.44	9.58	9.31	9.24	9.18	9.11	
17	9.37	9.30	9.24	9.17	9.11	9.04	8.97	8.91	
18	9.18	9.11	9.05	8.98	8.92	8.85	8.79	8.73	
19	8.99	8.92	8.86	8.80	8.73	8.67	8.61	8.54	
20	8.81	8.74	8.68	8.62	8.56	8.49	8.43	8.37	
21	8.63	8.57	8.51	8.45	8.39	8.33	8.27	8.21	
22	8.46	8.40	8.34	8.28	8.22	8.16	8.10	8.04	
23	8.30	8.24	8.18	8.12	8.06	8.00	7.95	7.89	
24	8.15	8.09	8.03	7.97	7.91	7.86	7.80	7.74	
25	7.99	7.94	7.88	7.82	7.76	7.71	7.65	7.59	
26	7.85	7.79	7.74	7.68	7.60	7.57	7.51	7.46	
27	7.70	7.65	7.59	7.54	7.48	7.43	7.37	7.32	
28	7.57	7.52	7.46	7.41	7.35	7.30	7.25	7.19	
29	7.44	7.38	7.33	7.28	7.22	7.17	7.12	7.06	
30	7.31	7.26	7.21	7.15	7.10	7.05	7.00	6.94	
31	7.19	7.14	7.08	7.03	6.98	6.93	6.88	6.82	
32	7.06	7.01	6.96	6.91	6.86	6.81	6.76	6.70	
33	6.95	6.90	6.85	6.80	6.70	6.70	6.64	6.59	
34	6.83	6.78	6.73	6.68	6.63	6.58	6.53	6.48	
35	6.73	6.68	6.63	6.58	6.53	6.48	6.43	6.38	
36	6.61	6.56	6.51	6.47	6.42	6.37	6.36	6.27	
37	6.51	6.46	6.41	6.36	6.31	6.27	6.22	6.17	
38	6.40	6.35	6.31	6.26	6.21	6.16	6.12	6.07	
39	6.30	6.26	6.21	6.16	6.12	6.07	6.02	5.98	
40	6.26	6.15	6.11	6.06	6.01	5.97	5.92	5.87	
41	6.10	6.06	6.01	5.96	5.92	5.86	5.83	5.78	
42	6.00	5.96	5.91	5.87	5.82	5.78	5.73	5.69	
43	5.91	5.86	5.82	5.77	5.73	5.69	5.64	5.60	
44	5.82	5.78	5.73	5.69	5.65	5.60	5.56	5.51	
45	5.72	5.68	5.64	5.59	5.55	5.51	5.46	5.42	
	5.64	5.59	5.55	5.51	5.47	5.42	5.38	5.34	

Source: Draft EPA Handbook of Methods for Acid Deposition Studies, Field Operations for Surface Water Chemistry, EPA/600/4-89/020, August 1989.

Stephanie
Carr/R1/USEPA/US
05/02/2006 08:57 AM

To jcreem@corillian.com
cc Bob.Drake@erm.com, Kevin.King@erm.com, Gennady
Shteynberg <gennady.shteynberg@po.state.ct.us>,
"Quillen, Todd" <TQuillen@TechLawInc.com>
bcc
Subject former IntelliData property

Dear Mr. Creem:

I am the EPA contact for Resource Conservation and Recovery Act (RCRA) Corrective Action at the former IntelliData property located at 80 Pickett District Road in New Milford, CT. The attached draft letter provides feedback on plans to meet RCRA Corrective Action requirements at the property in response to a letter dated December 19, 2005 from ERM.

I would be interested in meeting with you and/or ERM, along with Gene Shteynberg of CT DEP and Todd Quillen, of TechLaw Inc.(a contractor to EPA) to discuss the draft letter. If possible, we would like to meet at the 80 Pickett District Rd. property. Here are some possible dates and times that we are available:

preferred date: May 16 (any time between 9:30 am and 4 pm)

other dates: May 9 at 2 pm, May 11 in the morning, May 23 at 2 pm, May 25 in the morning

Once we agree on a date and time, I will draft an agenda and send it to you and ERM for your input.

Please let me know what would work for you. Thank you,

Stephanie Carr
EPA - Region I
1 Congress Street, Suite 1100 (HBT)
Boston, MA 02114-2023
phone: 617/918-1363



0605 draft letter on 050705 RTC.doc EIASOP-VOADIOX3.pdf

DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT

May , 2006

Joshua A. Creem
General Counsel
Corillian Corporation
3400 NW John Olsen Place
Hillsboro, OR 97124

RE: Letter dated December 19, 2005
Former CEE Associates/InteliData Facility, 80 Pickett District Rd., New Milford, CT,
CTD044121697

Dear Mr. Creem:

Thank you for the letter dated December 19, 2005, prepared by Environmental Resources Management (ERM), which responded to comments made in my July 5, 2005 letter to Lynn Brogis of InteliData Corporation regarding RCRA Corrective Action requirements for the former InteliData facility at 80 Pickett District Road in New Milford, CT. The purpose of this letter is to provide EPA's feedback on the December 19, 2005 letter. For brevity, EPA's original comments from the July 5, 2005 letter have not been repeated. However, the section and numbering scheme from the July 5, 2005 letter have been maintained for ease in referencing the original comments.

Section I - EPA Comments on the October 2004 Annual Report of Status of Remediation

General Comments

1. InteliData's response to this comment is adequate. Acetone and 2-butanone will be included in future soil vapor analyses.
2. InteliData's response to this comment appears to be partially adequate. The response to comments commits to collecting additional samples from well MW-17, and potentially other Neeltran wells, to evaluate the stability of the overburden plume. However, it is not clear when and how often the Neeltran wells will be sampled or what steps will be taken to identify and sample wells other than MW-17 on the Neeltran property, especially considering the information provided in the response to Specific Comment 13 which indicates that monitoring wells MW-1, MW-7, and MW-8 at the Neeltran property may have been destroyed. Please identify the wells that will be sampled, specify when and how often they will be sampled, and list the parameters that will be analyzed. In addition, please propose a schedule for reporting analytical results from these well samples to

EPA. Documentation from the Neeltran property, included as Appendix D of the October 2004 Annual Report, also notes that several bedrock wells are located on the Neeltran property. Sampling of these bedrock wells, if intact and appropriately located, should be conducted as part of site characterization and to support the Environmental Indicator (EI) evaluation of the bedrock aquifer. Please identify which bedrock wells will be sampled and propose a sampling frequency and a schedule for reporting analytical results to EPA.

For all Neeltran wells for which sampling is proposed, please provide boring logs and/or well construction diagrams or any available information on the depth and construction of each well.

3. IntelliData's response to this comment is inadequate. IntelliData has not provided an approach for defining the extent of contaminants in bedrock groundwater and for evaluating stability of the bedrock plume. As previously noted, concentrations of TCE and 1,1-dichloroethene have historically exceeded Connecticut Remediation Standard Regulations (RSRs) criteria. Most recently, 1,1-DCE was detected in bedrock groundwater in well BR-5 at 160 µg/L, exceeding the Connecticut Surface Water Protection Criteria (CT SWPC), in June 2003. While it is noted that concentrations decreased in this well between 2003 and 2004, IntelliData has not provided sufficient evidence to support a conclusion that this change in concentrations is due to natural attenuation rather than other factors, such as migration of the contaminated plume or seasonal fluctuation (the 2003 sample was collected during the summer; the 2004 sample was collected in the winter). In its December 19, 2005 letter, IntelliData concludes that VOCs detected in well BR-5 are isolated. However, the December 19, 2005 letter does not mention that 1,1-dichloroethene was detected in well BR-3 at concentrations exceeding the CT SWPC in August 2001.

IntelliData is not proposing to even consider investigating the bedrock aquifer downgradient of the known areas of contamination until after they evaluate whether natural attenuation will adequately remediate the VOCs in bedrock groundwater. As VOCs exceeding regulatory criteria have been detected in bedrock groundwater, the nature and extent of the bedrock plume needs to be defined in order to adequately characterize the site. Even if future monitoring data does suggest declining VOC concentrations in existing bedrock wells on the facility property, such data will not address the question of the nature and extent of groundwater contamination in bedrock downgradient of the facility. Therefore, defining the nature and extent of bedrock groundwater contamination and determining plume stability should be considered an immediate goal. Please provide a proposed approach for defining the extent of VOC contaminants in bedrock groundwater and for evaluating the stability of the bedrock plume. If bedrock wells are located on the Neeltran property, sampling of these wells, if they are determined to be installed at acceptable depths and constructed with appropriate methods, may be acceptable in lieu of installing additional downgradient bedrock wells. As an additional note, any determination that bedrock contamination at the former IntelliData facility is from an off-site source will need to be adequately supported.

For monitored natural attenuation (MNA) to be evaluated as a remedial alternative for VOC contamination, a thorough demonstration of the mechanisms and rate associated with the natural attenuation will be required. In EPA's directive "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" (OSWER Directive 9200.4-17P, dated April 21, 1999), it is stated that "decisions to employ MNA as a remedy or remedy component should be thoroughly and adequately supported with site-specific characterization data and analysis. In general, the level of site characterization necessary to support a comprehensive evaluation of MNA is more detailed than that needed to support active remediation. Site characterizations for natural attenuation generally warrant a quantitative understanding of source mass; groundwater flow (including preferential pathways); contaminant phase distribution and partitioning between soil, groundwater, and soil gas; rates of biological and non-biological transformation; and an understanding of how all of these factors are likely to vary with time."

Three lines of evidence presented in the OSWER Directive (EPA, April 21, 1999) are to be used in combination to support the decision to apply natural attenuation. The lines of evidence are summarized as follows: 1) Historical ground water and/or soil chemistry data that demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points; 2) Hydrogeologic and geochemical data that can be used to demonstrate indirectly the type(s) of natural attenuation processes active at the site, and the rate at which such processes will reduce contaminant concentrations to required levels; and 3) Data from field or microcosm studies (conducted in or with actual contaminated site media) which directly demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern (typically used to demonstrate biological degradation processes only). Additional guidelines for evaluating natural attenuation can be found in EPA's *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, dated September 1998. If IntelliData wishes to consider monitored natural attenuation as a remedial alternative for this project, please propose an approach for collecting the data necessary to support its use.

4. IntelliData's response to this comment is partially adequate. IntelliData has noted that "detection limits will be a concern when the assessment of compliance is performed following remediation." However, detection limits are a current concern for any existing data being used to evaluate whether the facility has achieved the Migration of Contaminated Groundwater Under Control Environmental Indicator. In addition, detection limits will be a concern for any data used to make decisions about future site characterization (such as dropping constituents or monitoring points from future evaluation) and for any data used to support an evaluation of remedial alternatives, particularly for evaluation of monitored natural attenuation.

In the Quality Assurance Project Plan, which IntelliData is preparing, reporting limits should be compared to project action limits. As the QAPP will set forth performance standards to be achieved in order for data to be accepted as "valid," EPA is not

commenting, at this time, on IntelliData's statement in the December 19, 2005 letter that "if no detection limit exceeds the published RSR criteria for a specific compound, the data will be accepted as valid."

In preparation of the QAPP, please be aware that a project action limit for 1,4 Dioxane should be based on EPA Region 9 Preliminary Remediation Goals, found at <http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf>. While the CT RSRs have Groundwater Protection Criteria and residential and industrial/commercial Direct Exposure Criteria for 1,4 Dioxane, the CT RSR criteria for 1,4 Dioxane are substantially higher than the corresponding EPA Region 9 PRGs. It is EPA's understanding that the reason for the difference is that the CT RSR criteria for 1,4 Dioxane only consider non-cancer effects, whereas the EPA Region 9 PRGs for 1,4 Dioxane are based on cancer risk. EPA Region I recommends the use of the EPA Region I 1,4 Dioxane analytical method for groundwater (enclosed). As the Region 9 PRG for groundwater is only slightly above the typical reporting limit, EPA Region I's lab has developed a series of Performance Evaluation (PE) samples, which are provided free of charge. I would recommend having your lab run these if you plan on analyzing groundwater samples. If you are interested in getting these PE samples, please let me know and I can put you in touch with the person who handles them.

5. IntelliData's response to this comment appears to be adequate. The additional sampling results were reviewed, and it appeared that only TPH and cyanide were identified above applicable CT RSR criteria. Cyanide was detected in only one sample (AOC-9 B6d) above the pollutant mobility criteria; however, a subsequent groundwater sample collected from nearby well ERM-14 did not report cyanide concentrations above the laboratory detection limit. Although this well did not report cyanide above the SWPC, it should continue to be monitored for cyanide as operation of the remediation system or other conditions may mobilize previously immobile constituents. Furthermore, areas downgradient of the vault area should continue to be monitored for cyanide, particularly since some onsite wells have reported cyanide concentrations just below the SWPC. Well ERM-10, further downgradient of the vault area, reported a cyanide concentration of 0.0292 mg/l in the February 2004 sampling event (SWPC = 0.052 mg/l).

Specific Comments

6. IntelliData's response to this comment appears to be adequate.
7. IntelliData's response to this comment is partially adequate. While it is recognized that trichloroethene (TCE) is a major constituent of concern, it is equally important to address any changes that occur with respect to other volatile organic compounds (VOCs) as they may aid in an evaluation of attenuation processes. Additionally, any figures depicting TCE or other contaminants of concern should be appropriately labeled.
8. IntelliData's response to this comment appears to be adequate.

9. InteliData's response to this comment is partially adequate. Please provide the plan and schedule for semi-annual groundwater monitoring (i.e., when sampling will be performed and when results will be reported to EPA), identify the wells to be monitored and the parameters to be analyzed. Additionally, please clarify whether access to other wells on the Neeltran property (other than MW-17) has already been obtained. The response to General Comment No. 2 indicates that future sampling from the MW-17 monitoring point "and others" was anticipated.
10. InteliData's response to this comment appears to be adequate.
11. InteliData's response to this comment appears to be adequate. A layout identifying the areas of concern (AOCs) on-site will be expected in the next submitted document.
12. InteliData's response to this comment is adequate. A revised figure has been submitted.
13. InteliData's response appears to be adequate. An access agreement has been negotiated with the Neeltran property and future sampling at this site is anticipated. Please respond to Comments # 2 and 3 of this letter, which request specifics with regard to future well sampling on the Neeltran property.
14. InteliData's response to this comment appears to be adequate. A revised figure has been submitted.

Errata

15.-18. It appears that comments 15 through 18 have been addressed appropriately.

Section II - Issues Raised in Previous Correspondence

19. The response to this comment appears to be partially adequate. The attached September 30, 2005 memo, addressed to Mr. Barry Keller of Teddy & Arthur Edelman, LTD, indicates that "VOCs in soil vapor are and will be present beneath the floor slab until completion of the remedial process." However, the memo did not mention that these VOCs from subsurface contamination may be entering the indoor air in the facility building. As requested in the completed Current Human Exposures Under Control checklist for 80 Pickett District Drive, InteliData must provide written notice, to the current owner of the 80 Pickett District Drive facility, that VOCs from subsurface contamination may be entering indoor air in the facility building. In addition, InteliData must provide a copy of this notice to EPA. Please provide such written notice to the current facility owner and provide a copy of this notice to EPA within 60 days of the date of this letter.
20. The response to this comment is partially adequate. InteliData has included geologic cross sections of the site; however, it would also be useful if the cross sections could show the screened intervals of the overburden wells or the depths at which open

boreholes are observed in the bedrock wells. Groundwater level information, if not included on the cross-section, should be included in a table so that this information can be cross-referenced with the geologic cross-sections.

Section III - Next Steps

Migration of Contaminated Groundwater Under Control Environmental Indicator Data Gaps

- *Assessing the Stability of the Overburden Plume:* IntelliData's response to this comment is partially adequate. IntelliData has indicated that an access agreement has been negotiated with the Neeltran property so that additional samples can be collected from off-site monitoring well MW-17. IntelliData should clarify whether it will be able to sample the additional wells at the site, as additional data can be used to further support a determination of plume stabilization in overburden groundwater.
- *Defining the Extent and Assessing the Stability of the Bedrock Groundwater Contaminant Plume:* IntelliData has not responded adequately to this comment. Additional delineation of the bedrock plume has not been proposed. Refer to the Section I of this letter, General Comments, for more information and requests for additional information relative to bedrock aquifer contamination.
- *Monitoring Groundwater to Verify that Migration of Groundwater Contaminant Plume has Remained Stable:* IntelliData's response to this comment appears to be inadequate. EPA made specific requests with respect to proposed groundwater monitoring for the groundwater EI, but IntelliData has failed to provide most of the requested information. As previously stated, please identify the wells at which groundwater contaminant concentrations will be monitored and specify the parameters for which groundwater samples will be analyzed. Additionally, please specify which wells will be monitored at the Neeltran facility.

The schedule also notes that sampling will be conducted semi-annually for the first two years of the remediation system operation. Please, specify the months when this semi-annual sampling will be conducted and when results from each round are expected to be submitted to EPA.

Quality Assurance Project Planning

The response to this comment is adequate provided that IntelliData submit a QAPP prior to the next round of groundwater sampling.

Schedule

InteliData's response to this comment is inadequate. As previously noted, InteliData has not proposed additional investigations to delineate the extent of bedrock aquifer contamination or to determine plume stability in either the overburden and bedrock aquifers. Additionally, InteliData has not provided a target date for submittal to EPA of a completed Documentation of Environmental Indicator Checklist documenting achievement of the Migration of Contaminated Groundwater Under Control EI. A scheduled date for submittal of a QAPP has also not been specified, other than to note that it would be submitted before the next round of groundwater sampling. InteliData has not specified scheduled dates for the additional work necessary in order for a site-wide remedy decision to be made for the site. Before a site-wide remedy decision can be made, the nature and extent of contamination must be fully characterized. Please revisit the requested items in EPA's July 5, 2005 letter, and provide a schedule for the anticipated completion of those activities.

Within 60 days of the date of this letter, please provide, to EPA, the information requested in this letter. In addition, please copy both Gene Shteynberg, CT DEP and me on future correspondence related to investigation and remediation at 80 Pickett District Rod. Please feel free to contact me at 617/918-1363 if you have any questions on this letter.

Sincerely,

Stephanie Carr
RCRA Facility Manager

cc: Kevin King, ERM
Bob Drake, ERM
Gene Shteynberg, CT DEP

EIASOP-VOADIOX2
1,4-Dioxane
in water by GC/MS
Revision 2
3/08/04
Page 1 of 23

STANDARD OPERATING PROCEDURE FOR
MEASUREMENT OF PURGEABLE 1,4-DIOXANE IN WATER BY GC/MS

The Office of Environmental Measurement and Evaluation
EPA Region New England
11 Technology Dr
North Chelmsford, MA 01863

Prepared by: Dan Boudreau Date: 3/8/04
Dan Boudreau, Chemist
Investigations and Analysis Unit, OEME

Approved by: Agnes Van Langenhove Date: 3/9/04
Agnes Van Langenhove, Laboratory QA Officer
Investigations and Analysis Unit, OEME

Approved by: Robert Maxfield Date: 3/8/04
Robert Maxfield, Chief Effective
Investigations and Analysis Unit, OEME Unit Manager

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1.0 Scope and Application:

- 1.1 The procedure contained herein is applicable to all EPA Region I chemists performing 1,4-Dioxane [123-91-9] analysis by GC/MS with purge and trap.
- 1.2 This method is applicable for analysis of drinking water, ground water and surface water.

Table I - Target Compound List

<u>Analyte</u>	<u>RL, ug/L</u>
1,4-Dioxane	1.0

- 1.3 This SOP is to be used in conjunction with EIA-VOAGCMS5.SOP.

2.0 Summary of Method:

1,4-Dioxane is purged from the sample matrix by bubbling helium through a 5-mL sample. The high solubility of 1,4-dioxane in water causes a low purge efficiency. Heating the sample to 80 °C prior to purging increases the purge efficiency. Purged sample components are trapped in a tube containing suitable sorbent materials. When purging is complete, the sorbent tube is heated and back flushed with helium to desorb the trapped sample components on to a capillary gas chromatographic (GC) column interfaced to a mass spectrometer (MS). The column is temperature programmed to separate the method analytes which are then detected with the mass spectrometer. Compounds eluting from the GC columns are identified by comparing their measured mass spectra and retention times to reference spectra and retention times in the data base. Reference spectra and retention times for analytes are obtained by the measurement of calibration standards under the same conditions used for samples. The

concentration of each identified component is measured by relating the mass spectrometric response of the quantitation ion produced by that compound to the response of the quantitation ion produced by the associated internal standard. Surrogates, whose concentrations are known in every sample, are measured with the same internal standard quantitation procedure. Dilutions are accomplished by removing an aliquot of the sample and diluting to the needed total volume with reagent water.

3.0 Definitions:

- 3.1 FIELD DUPLICATES (FD1 and FD2): Two separate samples collected at the same time and place under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analyses of FD1 and FD2 give a measure of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures.
- 3.2 Laboratory Duplicate (LD1 and LD2): Two injections from the same sample. The analyses of LD1 and LD2 give a measure of the precision associated with the laboratory procedure.
- 3.4 LABORATORY REAGENT BLANK (LRB): An aliquot of VOA free reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, and reagents that are used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.
- 3.5 STOCK STANDARD SOLUTION: A concentrated solution containing one or more method analytes (in methanol) prepared in the laboratory using assayed reference materials or purchased from a reputable commercial source.
- 3.6 WORKING STANDARD SOLUTION: A solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare aqueous calibration solutions and other needed analyte solutions.

- 3.7 SECONDARY STANDARD: A standard from another vendor or a different lot number that is used to check the primary standard used for quantitation.
- 3.8 LABORATORY FORTIFIED BLANK (LFB) -- An aliquot of reagent water or other blank matrix to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements. The Lfb/CCV and LCS for this analysis are all the same. They are a 10 ppb sample prepped from a second source standard.
- 4.0 **Health and Safety Warnings:**
- 4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical should be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets should be made available to all personnel involved in these analyses. For example, concentrated sulfuric acid presents some hazards and is moderately toxic and extremely irritating to skin and mucous membranes. Use these reagents in a fume hood whenever possible and if eye or skin contact occurs flush with large volumes of water.
- 4.2 Always wear safety glasses or a shield for eye protection, protective clothing, and observe proper mixing when working with these reagents.
- 4.3 Some method analytes have been tentatively classified as known or suspected human or mammalian carcinogens. Pure standard materials and stock standard solutions of these compounds should be handled with suitable protection to skin, eyes, etc.

5.0 Interferences:

- 5.1 Method interferences may be caused by contaminants in solvents, reagents, glassware and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. All of these materials must routinely be demonstrated to be free from interferences under the conditions of the analysis by running laboratory method blanks.
- 5.2 Matrix interferences may be caused by contaminants that co-elute with the target compounds. The extent of matrix interferences will vary considerably from source to source.
- 5.3 Contamination by carry-over can occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, a VOA free water blank should be analyzed following an unusually concentrated sample to assure that the syringe is clean.

6.0 Personnel Qualifications:

- 6.1 The analyst should have at least a four year degree in a physical science.
- 6.2 The analyst must have a satisfactory IDC/MDL in place before analyzing samples.
- 6.3 All personnel shall be responsible for complying with all quality assurance/quality control requirements that pertain to their organizational/technical function.

7.0 Equipment and Supplies:

- 7.1 ThermoFinnigan PolarisQ ion-trap MS with a ThermoFinnigan

Trace 2000 GC.

- 7.2 GC column - 40 meter x 0.18 mm i.d. with a 1.0 um film thickness; Rtx-502.2 (Restek Corp.)
- 7.3 Varian Archon autosampler with a Tekmar LSC 3100 equipped with a 5-mL fritted sparge vessel and a Tekmar Purge Trap K (VOCARB 3000).
- 7.4 Vial: 40 mL VOA vials with a Teflon lined septum cap.
- 7.5 5,10,25,50,100 and 500 uL microsyringes.
- 7.6 5mL and 100 mL volumetric flasks.

8.0 Standards and Reagents

- 8.1 Methanol - demonstrated to be free of analytes.
- 8.2 Reagent water

- 8.3 Standard and Secondary Stock Solutions - Solutions are prepared from pure standard materials and purchased by the Region I Chemistry Laboratory. The calibration standard is obtained from Restek, cat#30287, 1,4-Dioxane Standard, 2,000ug/mL in P&T methanol. Secondary (calibration validation) standard is obtained from Ultra Scientific, 1,4-Dioxane Solution, cat# NV-150, 100 ug/ml in methanol. The surrogate standard is prepared from neat compound, 1,4-Dioxane-d₈, Cambridge Isotope Lab, cat# DLM-28. The internal standard, 4-BFB, is obtained from Ultra Scientific, part # STS-110N, 2,000 ug/mL in MeOH.

8.3.1 Standard Preparation and Use:

The working calibration standard is prepped by diluting 250uL of the Restek standard to 5 mL with methanol. This

gives the 100 ug/mL working solution. This is used to make the calibration curve by injecting 1,5,10,20,50 and 100 uL into 100 mL of reagent water. This gives standards of 1 - 100 ppb. This aqueous standard is poured into a VOA vial for analysis.

The secondary standard is used as received. The ampule is opened and the standard is transferred to an amber 2 mL vial. This solution is used for the CCV/LCS and spiking. The CCV/LCS is prepped at 10 ppb.

The surrogate standard is prepared by diluting 10 uL of the neat compound to 5 mL in methanol. Then 250 uL of this solution is diluted a second time to 5 mL in methanol. This results in a surrogate solution of ~100 ppb. This solution is added to the same 100 mL flask as the calibration standard.

The internal standard is prepared by diluting 12.5 uL of BFB solution to 5 mL in MeOH. This results in a 5.00 ppb solution that is loaded into the Archon IS/SU vessel. The autosampler adds 1 uL to each sample for a concentration of 1.0 ppb.

9.0 Calibration:

- 9.1 Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed and is required routinely throughout sample analysis as dictated by results of continuing calibration checks. The relative standard deviation (RSD) of each analyte must be less than 30%. After the initial calibration is successful, a continuing calibration check is required at the beginning of each 12-hour period during which analyses are performed. Samples may also be analyzed following an initial calibration, if time permits. The analytical sequence is closed with a CCV.

9.1.1 Calibration ions:

Compound	Primary ion	Secondary ion(s)
1,4-Dioxane	88	58
1,4-Dioxane- d_8 (SS)	96	64
BFB (IS)	174	176, 95

9.2 Initial Calibration

9.2.1 Mass Spectrometer Calibration and Tuning Procedure

When necessary, calibrate the mass axis and adjust the tuning of the mass spectrometer using the procedures prescribed by the manufacturer with any modifications necessary to meet the requirements in Section 9.2.2.

9.2.2 At the beginning of each 12-hour work shift during which analyses are performed, introduce into the GC (either by purging a laboratory reagent blank or making a syringe injection) 50 ng of BFB and acquire mass spectra for m/z 35-300 at an electron energy equivalent to 70 eV. If the spectra does not meet all criteria (see Table 1), the mass spectrometer must be retuned and adjusted to meet the EPA program required criteria before proceeding with calibration and sample analysis. An average spectrum across the BFB peak may be used to test the instrument performance. A background-subtracted spectrum must be used to evaluate the performance of the system.

Table 1. Ion Abundance Criteria For 4-Bromofluorobenzene (BFB)

m/z	Relative Abundance Criteria
50	15 to 40% of m/z 95
75	30 to 60% of m/z 95
95	Base peak, 100% relative abundance

96	5 to 9% of m/z 95
173	less than 2% of m/z 174
174	50% to 100% of m/z 95
175	5 to 9% of m/z 174
176	95% to 101% of m/z 174
177	5 to 9% of m/z 176

- 9.2.3 When an initial calibration is required, prepare the calibration standards according to Section 8.9.
- 9.2.4 Analyze the calibration standards using the purge and trap and GC/MS parameters given in Attachment A.
- 9.2.5 Check each standard for good GC performance. Good column performance will produce symmetrical peaks with minimum tailing. If peaks are broad, or if sensitivity is poor, remedial action may be necessary.
- 9.2.6 Calculate response factors (RF) for 1,4-dioxane and 1,4-dioxane- d_8 . This calculation is supported in the GC/MS data system software. RF is a dimensionless number, but units used to express quantities of analyte and internal standard must be equivalent.
- 9.2.6.1 Calculate the mean RF from the analyses of the calibration solutions. Calculate the standard deviation and the percent relative standard deviation from each mean. If the %RSD exceeds 30%, either analyze additional aliquots of appropriate calibration solutions to obtain an acceptable %RSD over the entire concentration range, or take action to improve GC/MS performance.
- 9.2.6.2 Verify the accuracy of the initial calibration by preparing and analyzing a Laboratory Control Sample (LCS).
- 9.2.6.3 If time remains in the 12-hour time

period after meeting the initial calibration QC acceptance criteria, blanks and samples may be analyzed.

9.3 Continuing Calibration

- 9.3.1 At the beginning of each 12-hour work shift during which analyses are performed, analyze BFB according to the directions in Section 9.2.2. If the spectrum does not meet all criteria the mass spectrometer must be retuned and adjusted to meet all criteria before proceeding with continuing calibration.
- 9.3.2 Prepare and analyze a 10.0 ppb CCV and analyze with the same GC/MS conditions used during the initial calibration.
- 9.3.3 Calculate the RFs for 1,4-dioxane and 1,4-dioxane- d_8 from the data measured in the continuing calibration. The RF must be within 30% of the mean value measured in the initial calibration. If these conditions do not exist, corrective action must be taken which may require a new initial calibration.

10.0 Sample Collection, Preservation and Storage

10.1 Sample Collection and Preservation

- 10.1.1 Samples should be received in glass vials with Teflon-lined septa without headspace. Samples should not be acid preserved. Handling of samples should be done in accordance with all Chain of Custody procedures being observed within and outside of the laboratory.
- 10.1.2 The samples must be chilled to 4 °C on the day of collection and maintained at that temperature until analysis. Field samples that will not be received at the laboratory on the day of collection must be packaged for shipment with

sufficient ice to ensure that they will be maintained at 4 °C on arrival at the laboratory.

10.2 Sample Storage

- 10.2.1 Samples should be preserved by storing them in a dark area at 4 °C until analysis. The sample storage area must be free of organic solvent vapors.
- 10.2.2 Analyze all samples within 14 days of collection. Samples not analyzed within this period must be discarded and replaced, unless after consultation with project management of the applicable program, it is determined that the analysis may be performed.

11.0 Sample Analysis

- 11.1 See attachment A for all operating conditions.
- 11.2 At the start of each 12-hour period during which standards or samples are to be analyzed, analyze BFB according to the directions of Section 9.2.2.
- 11.3 After achieving a tune and an appropriate calibration, proceed with sample analysis.

- 11.3.1 The order for sample analysis is as follows:

- BFB tune check standard (50 ng)
- CCV (10.0 PPB)
- Method Blank (MB)
- Field Blank (if any)
- Samples
- Matrix Spike/ Matrix Spike Duplicate (when required)
- Close out CCV
- Load Lastrun method

11.4 Sample vials are placed in Archon autosampler. The autosampler is started after the GC/MS sequence has been downloaded.

11.5 If the sample concentration exceeds the linear range of the calibration curve sample dilution with reagent water should be carried out.

12.0 Identification and Quantitation:

12.1 Identification of Analyses

Identify a sample component by comparison of its mass spectrum (after background subtraction) to a reference spectrum. The GC retention time of the sample component should be within +/- 30 sec of the predicted time.

12.1.1 In general, all ions that are present above 10% relative abundance in the mass spectrum of the standard should be present in the mass spectrum of the sample component and should agree within a 20% range. For example, if an ion has a relative abundance of 30% in the standard spectrum, its abundance in the sample spectrum should be in the range of 10 to 50%. Some ions, particularly the molecular ion, are of special importance, and should be evaluated even if they are below 10% relative abundance.

12.1.2 Identification requires expert judgment when sample components are not chromatographically resolved and produce mass spectra containing ions contributed by more than one analyte. When GC peaks obviously represent more than one sample component (i.e., broadened peak with shoulder(s) between two or more maxima), appropriate analyte spectra and background spectra can be selected. When analytes co-elute (i.e., only one GC peak is apparent), the identification criteria can be met, but each analyte's mass spectrum will contain extraneous ions contributed by the co-eluting compound. With the gas chromatographic conditions of this method, 1,4-

dioxane and the internal standard, 1,4-dioxane- d_8 , are not fully resolved. To avoid the possibility of false negatives for 1,4-dioxane, the analyst must examine and submit mass chromatograms of m/z 88 centered at the expected retention time of 1,4-dioxane.

12.2 Calculations

12.2.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations if unique ions with adequate intensities are available for quantitation.

12.2.2 Calculate analyte concentration.

$$C_x = \frac{(A_x)(C_{IS})}{(A_{IS})(RF)(V_o)}$$

where:

C_x = concentration of analyte in micrograms per liter in the water sample
 A_x = peak area of the quantitation ion of the analyte in the sample
 A_{IS} = peak area of the quantitation ion of the internal standard in the sample
 C_{IS} = total quantity (in micrograms) of internal standard added to the water sample
 RF = response factor of analyte from the initial calibration.
 V_o = Volume of water extracted (L)

12.2.3 Alternatively, use the GC/MS system software or other proven software to compute the concentration of analyte.

12.2.4 Calculations should utilize all available digits of precision, but final reported concentrations should be rounded to two significant figures.

13.0 Quality Control:

See TABLE 2 for criteria.

13.1 Initial Demonstration of Precision and Accuracy

13.1.1 Prepare a QC reference sample containing 1,4-dioxane at 5.0 ppb. The calibration standards and the QC standards are prepared from solutions obtained from different vendors.

13.1.2 Analyze the QC reference sample at least four consecutive times following the calibration and analysis procedures of Sections 9 and 11. Accept results only if routine data validation procedures are acceptable.

13.1.3 Tabulate all results and calculate the average recovery in micrograms per liter and in percent values, the standard deviation in $\mu\text{g/L}$, and the relative standard deviation (RSD) in percent values.

13.1.4 The data is acceptable if the average recovery is in the range of 60-140%.

13.2 Determination of Method Detection Limits (MDLs)

Analyze seven replicates of a calibration standard containing 2 $\mu\text{g/L}$ of 1,4-dioxane and 1,4-dioxane- d_8 .

13.2.1 Calculate and tabulate all results of 1,4-dioxane and 1,4-dioxane- d_8 , including the number of acceptable results (n), the average recovery in $\mu\text{g/L}$ and in percent values, and the standard deviation in $\mu\text{g/L}$.

13.3 Daily Quality Control

13.3.1 The GC/MS mass and abundance scales must be calibrated and tuned using PFTBA if the BFB criteria cannot be met. On a routine basis BFB is analyzed daily to confirm the calibration and tune. No sample analysis may be initiated without an acceptable 50-ng BFB tune check, laboratory blank results, and continuing calibration standard RFs. Acceptable tune checks from BFB, RFs from continuing calibrations and blank results are required in every 12-hour analysis set. The blank analysis should demonstrate that interferences from the analytical system, glassware, and reagents are under control.

13.3.2 BFB (50 ng) is analyzed with mass spectra acquired for m/z 35-300. If the spectrum does not meet all criteria analyses cannot proceed until corrective action is taken and acceptable mass spectra is obtained.

13.3.3 No analysis may be initiated without an appropriate five-point calibration curve. Each analyte and surrogate must have an RSD less than or equal to 30%. For each analyte or surrogate with an RSD exceeding 30%, flag the analyte in all associated data.

13.3.4 A continuing calibration standard meeting criteria must be analyzed every 12-hours. If the continuing calibration standard's response factors meet criteria the analysis can continue.

13.3.4.1 Acceptance criteria for continuing calibration standard results are:

(a) Percent differences (%D) between the RF of the daily standard and the average of the five-point initial calibration curve are less than 30%. The percent difference is defined in the following equation:

$$\%D = \frac{RF_{cc} - \overline{RF}_{IC}}{\overline{RF}_{IC}} \times 100$$

where

RF_{cc} = Response factor from continuing calibration
 \overline{RF}_{IC} = Average response factor from the most recent initial calibration meeting the technical acceptance criteria

(b) If a compound with an unacceptable %RSD or %D is detected in a sample, the analysis should be repeated, if the holding time will not be exceeded.

(c) If the %D for the RFs are deemed unacceptable for the target, sample analysis cannot be initiated, and corrective action must be taken. Either another continuing calibration standard or a five-point initial calibration curve must be analyzed.

13.3.5 A method blank is tested after the BFB check and the continuing calibration and for every 12-hour interval in which samples are analyzed. The method blank must contain the target at levels less than its RL.

13.3.6 Internal Standards

The absolute area of the internal standard's quantitation ion will be tabulated in a run sequence as part of sample analysis records. The internal standard areas from any sample may vary within the range of 50% to 200% of the corresponding areas from the day's continuing calibration standard. The internal standard retention times from any sample may vary within the range of ± 30 seconds of the corresponding retention times from the day's continuing calibration standard. When any internal standard response exceeds the -50% to +100% area variation or when any retention time exceeds the ± 30

second variation, the sample should be re-analyzed.

13.3.7 Surrogate Recoveries

Each sample, standard and blank must contain 1,4-dioxane- d_8 at 10 $\mu\text{g/L}$ as a surrogate. Acceptable recoveries are 40% - 160%. As data are accumulated, the acceptable recovery range may be revised as appropriate. Surrogate percent recoveries will be reported with each sample.

13.3.8 Matrix Spike/Matrix Spike Duplicate

With each project a matrix spike and matrix spike duplicate will be analyzed. The spiked samples must be carried through all stages of the sample preparation and analysis steps. Recoveries must be within the range of 60% to 140%. As data are accumulated, the acceptable recovery range may be revised as appropriate.

13.3.9 Laboratory Control Sample

A Laboratory Control Sample (LFB/LCS/CCV) is prepared at 10.0 ppb from a secondary source. Recoveries of 1,4-dioxane must be in the range of 60% to 140%.

14.0 Data and Records Management:

14.1 All work performed for the analyses of samples will be entered into the appropriate logbook.

15. References:

1. "Standard Operating Procedure for Measurement of Purgeable 1,4-Dioxane and THF in Water By Wide-Bore Capillary Column Gas Chromatography/Mass Spectrometry,"

- CRL SOP GCMS023, Rev. 2, Jan 9, 2002, USEPA, Region V,
CRL, Chicago, Illinois.
2. "Method 524.2, Rev. 3.0, Measurement of Purgeable
Organic Compounds in Water by Capillary Column Gas
Chromatography/Mass Spectrometry", 1989, USEPA, EMSL,
Cincinnati, Ohio.
 3. Federal Register, 40 CFR Part 136, Appendix B, Friday,
October 26, 1984, Vol. 49 No. 209, p. 149-150 and
198-199.
 4. "Incos 50 GC/MS Operation for Volatile Organic
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Environmental Measurement and Evaluation(OEME) U.S.
Environmental Protection Agency, Region I.

ATTACHMENT A

PURGE AND TRAP CONDITIONS

EIASOP-VOADIOX2
1,4-Dioxane
in water by GC/MS
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LSC 3100 Method 2

Trap: Tekmar Purge Trap K (VOCARB 3000).
Purge Flow = 30 mL/min of helium
Line, Valve Temperature of Tekmar 2000 concentrator = 100 °C
Purge Ready (Standby) Temp = 35 °C
Sample Heater = ON
Sample Preheat Time = 2 min
Sample Preheat Temp = 80 °C
Purge Time = 11 min
Dry Purge Time = 2.0 min
Desorb Preheat Time = 245 °C
Desorb Time = 4 min
Desorb Temp = 250 °C
Sample Drain = ON
Bake Time = 15 min
Bake Temp = 260 °C
Bake Gas Bypass = OFF
Bake Gas Bypass Delay = 0.0 min

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Archon Method

Sample Volume: 5mL
Rinse Volume: 5 mL
#Rinses: 3
Standard: 1 (Load IS/SU into vial #1, left side)
Syringe Flushes: 3

GC/MS CONDITIONS ***pdioxane Method***

OVEN: Initial oven temperature of 40 °C for 5 minutes; a
rate of 10 °C/min to a final temperature of 220 °C
for 3 min. Run time = 26.0 min.
INLET: Injection port temperature = 180 °C.
COLUMN: 40 meter x 0.18 mm i.d. with a 1.0 um film
thickness; Rtx-502.2 (Restek Corp.)
MS transfer line temperature = 220 °C.

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1,4-Dioxane
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MS Method:

Acquistion Time: GC Run time
Cal Gas: Off
Reagent Gas: Off
Acquire Profile: No
Acq Threshold: 0
Source Temp: 200 C

Segment 1
Start Time: 3.00 minutes
Polarity: POS
Mult Offset: + 100 volts
Tune File: enviromentalbfb
Reagent gas flow: Off

Scan Event 1
Micro Scans: 2
Max Ion Time: 25
Mass Defect: 0.00
Scan Mode: Segmented scan
Contiguous Ranges: Yes
Custom Inj RF: Yes
Custom Gate Lens: No
Single AGC prescan: No
First Mass: 35 Last: 70 Inj RF: 25.00 Inj Scale: 220
First Mass: 71 Last: 120 Inj RF: 25.00 Inj Scale: 110
First Mass: 121 Last: 300 Inj RF: 29.00 Inj Scale : 100

TABLE 2: QC Acceptance criteria

AUDIT	FREQUENCY	LIMIT	CORRECTIVE ACTION
BFB	Before analysis and every 12 hrs.	See sec 9.2.2	Repeat BFB Tune MS Clean source
Initial Cal	When cont cal fails or as method requires	%RSD </+ 30., Sec 9.2	Eval chromatogram and integration Re- Calibrate
Cont Cal	Before analysis and every 12 hrs.	%D </+ 30% Sec. 9.3 & 13.3.4	Eval Chromatogram and integration Repeat multi-cal
Method Blk	Before analysis and every 12 hours	Free of all target analytes > RL. sec 13.3.5	Check blank source Check reagent source Bake trap Clean purge vessel Rinse syringes
Trip Blk	One/set of samples		Check storage blk Contact project officer
Lab Fortified Blk (CCV&LCS)	Before analysis and every 12 hrs.	$\pm 40\%$, sec 13.3.9	Check peak integration Test for leaks Repeat
Matrix Spikes	One MS/MSD for every project up to 20 samples	60 - 140 % sec 13.3.8	Areas of internal std Explain in report narrative
Internal Std	Every sample including std, blk and QC samples	-50% - 200%, sec 13.3.6	Re-run the sample Check the solution
Surrogate Recoveries	Every sample including std, blk, and QC sample	60-140% sec 13.3.7	Eval integration Quality the report